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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/739,139	12/18/2000	Wei-Yung Hsu	AMAT/5614/CMP/RKK	4854

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APPLIED MATERIALS, INC.
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SANTA CLARA, CA 95050

EXAMINER	
MACARTHUR, SYLVIA	

ART UNIT	PAPER NUMBER
1763	13

DATE MAILED: 06/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

SUPPLEMENTAL

Office Action Summary

Application No.	Applicant(s)	
09/739,139	HSU ET AL.	
Examiner	**Art Unit**	
Sylvia R MacArthur	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 May 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29 and 89-119* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29 and 89-119* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☒ Interview Summary (PTO-413) Paper No(s). *21* .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-3, 9, 14, 89, 90, 93, 95, 96, 98, and 100 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schwartz et al (USP 6,080,288) in view of Uzoh (US 6,066,030 known hereafter as Uzoh'030).

Regarding claims 1-3: Schwartz teaches a system 10, which includes cell (partial enclosure) 12 having a first inlet 18, a second inlet 20, and fluid outlet 16. A shaft (conduit 58) is connected to the partial enclosure 12 on one end and to an actuator (motor 60) on an opposing end and adapted to rotate the partial enclosure 12. A permeable disc (rotatable plate 52) is disposed in the partial enclosure. A diffuser plate 30 disposed in the partial enclosure is below the permeable disc 52.

Schwartz fails to teach vertical and lateral movement.

Uzoh '030 teaches a polishing head 1 that is rotated, vertically moved, and laterally moved.

The motivation to move the polishing head in this fashion is to increase polishing pressure on the workpiece as stated in col.3 lines 14-18.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to modify the apparatus of Schwartz to provide vertical and lateral movement of the substrate carrier as taught by Uzoh'030.

Regarding claim 9: Schwartz teaches that the permeable disc 52 comprises a plurality of pore (apertures 56).

Regarding claim 14: Schwartz teaches a planarizer 50 which is coupled to actuator 60 (motor) causes circular rotation between the substrate and the permeable disk.

Regarding claims 89 and 90: Schwartz teaches a permeable disc 52 disposed in the partial enclosure and supported at a distance spaced from the electrode (The cathode assembly includes a removable cassette 67 (substrate carrier) which holds a glass master 70 (substrate). Two electrical contacts 75 and 76 are disposed about the perimeter of substrate receiving surface.

Schwartz further teaches a system 10, which includes cell (partial enclosure) 12 having a first inlet 18, a second inlet 20, and fluid outlet 16. A shaft (conduit 58) is connected to the partial enclosure 12 on one end and to an actuator (motor 60) on an opposing end and adapted to rotate the partial enclosure 12. A permeable disc (rotatable plate 52) is disposed in the partial enclosure. A diffuser plate 30 disposed in the partial enclosure is below the permeable disc 52.

Schwartz fails to teach vertical and lateral movement.

Uzoh '030 teaches a polishing head 1 that is rotated, vertically moved, and laterally moved.

The motivation to move the polishing head in this fashion is to increase polishing pressure on the workpiece as stated in col.3 lines 14-18.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to modify the apparatus of Schwartz to provide vertical and lateral movement of the substrate carrier as taught by Uzoh'030.

Regarding claim 93: Schwartz teaches a planarizer 50 which is coupled to actuator 60 (motor) causes circular rotation between the substrate and the permeable disk.

Regarding claims 95 and 96: Schwartz teaches a system 10, which includes cell (partial enclosure) 12 defining a processing region and having a first inlet 18, a second inlet 20, and fluid outlet 16. The first and second inlets 18 and 20 are coupled to a supply conduit 21 which carries pressurized electrolyte 22 from a sump assembly. A shaft (conduit 58) is connected to the partial enclosure 12 on one end and to an actuator (motor 60) on an opposing end and adapted to rotate the partial enclosure 12. A permeable disc (rotatable plate 52) is disposed in the partial enclosure. A diffuser plate 30 disposed in the partial enclosure is below the permeable disc 52.

Schwartz fails to teach vertical and lateral movement.

Uzoh '030 teaches a polishing head 1 that is rotated, vertically moved, and laterally moved.

The motivation to move the polishing head in this fashion is to increase polishing pressure on the workpiece as stated in col.3 lines 14-18.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to modify the apparatus of Schwartz to provide vertical and lateral movement of the substrate carrier as taught by Uzoh'030.

Regarding claim 98: Schwartz teaches an electrode (anode basket 40) disposed in the partial enclosure below the permeable disc.

Regarding claim 100: Schwartz teaches the planarizer 50, which is coupled to actuator 60 (motor) causes circular rotation between the substrate and the permeable disk.

3. Claims 4,5, 7, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schwartz in view of Uzoh '030 as applied to claims 1-3, 9, 14, 89, 90, 93, 95, 96, 98, and 100 above, and further in view of in view of Uzoh et al (USP 6,261,426, known hereafter as Uzoh'426).

The teachings of Schwartz and Uzoh'030 were discussed above.

Regarding claims 4 and 7: Schwartz and Uzoh fail to teach that the diffuser plate is made of plastic or the materials listed in claim 7.

Uzoh '426 teaches both baffle 8 (diffuser plate) and shield 10 are comprised of a non-conductive material such as Teflon (fluoropolymers), PVDF or polyvinylchloride (plastic).

The motivation to construct the diffuser plate of resulting from the combination of Schwartz in view of Uzoh '030 or Pearson in view of Uzoh'030 with the materials taught by Uzoh'426 is that these are non-conductive and will not affect the electrical properties of the plate and thus affect the flow of materials through the plate.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to construct the apparatus comprising the teachings of Schwartz modified by Uzoh'030 of the materials suggested by Uzoh'426.

Regarding claim 5: Schwartz and Uzoh fail to teach an anode disposed in the partial enclosure below the diffuser plate.

Uzoh '426 teaches that cup 14 (partial enclosure) also contains a counterelectrode 4 upheld by a support member 20. Interposed for bath flow control between counter electrode 4 and target substrate 12 are baffle (diffuser plate) 8, supported by mounting bracket 18, and shield 10, supported by baffle 8.

The motivation for the placement of the anode below the diffuser plate is that diffuser plates are known suitable means of controlling fluid flow and would allow for better control of electro-deposition onto the substrate.

Regarding claim 8: Schwartz teaches that the diffuser 30 (diffuser plate) has a plurality of openings 33 (holes).

4. Claims 10, 12, 13, 19, 23, 25, 92, and 99 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schwartz in view of Uzoh '030 as applied to claims 1-3, 9, 14, 89, 90, 93, 95, 96, 98, and 100 above, and further in view of Pearson (US 3,763,027).

The teachings of Schwartz and Uzoh were discussed above.

Regarding claims 10 and 23 both fail to teach the permeable disk comprising grooves.

Pearson teaches permeable disk 25 comprising scallops (grooves).

The motivation to modify the disk resulting from the combined teachings of Schwartz and Uzoh with grooves is to allow the fluid to flow along such grooves and enhance flow control, see col. 3 lines 55-64.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide the disk of Schwartz modified by Uzoh with grooves.

Regarding claim 12 and 25, both fail to teach that the anode is in contact with the permeable disk.

Pearson illustrates anodes 32 and 33 wherein the anodes are in contact with disk 25, according to col. 2 lines 48-50 the anodes extend through plate 25.

The motivation to modify the apparatus of Schwartz and Uzoh allowing the anode to contact of anode and disk which enhances the electroplating process by providing better fluid flow using the electrode to further distribute the fluid.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to modify the apparatus of Schwartz and Uzoh to provide contact of anode and disk.

Regarding claims 13, 92, and 99 both fail to teach a membrane disposed between the anode (electrode) and the permeable disk.

Pearson teaches a membrane 24 between anode 32, 33 and disk (plate 25).

The motivation to provide a membrane between the anode and disk is to provide additional fluid flow control providing a uniform amount of electrolyte per unit area across the substrate.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to modify the apparatus of Schwartz and Uzoh to provide a membrane between the anode and disk as Pearson teaches.

Regarding claim 19, both Schwartz and Uzoh fail to teach the anode is below the diffuser plate.

Pearson teaches the anodes 32 and 33 below diffuser plate 12.

The motivation to orient the anode below the diffuser plate is to allow the anode to enhance the electroplating process by providing a better control of the fluid flow.

5. Claims 15-17, 22, 26, 28, 29, 94, 101-110, 112, and 114-119 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schwartz and Uzoh '030 as applied to claims 1-3, 9, 14, 89, 90, 93, 95, 96, 98, and 100 above, in further view of Cheung et al (USP 6,258,223).

The teachings of Schwartz and Uzoh'030 were discussed above.

Regarding claim 15: Schwartz and Uzoh'030 fail to teach multiple processing stations, a loading station, and a substrate transfer device.

Cheung illustrates in Fig. 3 an electroplating system platform 200 comprises a loading station 210, a plurality of processing stations 218. Each processing station 218 includes one or more processing cells 240. Substrate orientor 230 acts as a substrate transfer device. Figure 6 illustrates an electroplating process cell 400, the substrate holder assembly 450 is positioned above the process kit 420. The process kit 420 generally comprises a bowl 430, a container body 472, an anode assembly 474 and a filter 476. The container body 472 is preferably comprised of an electrically insulative material, such as ceramics, plastics, acrylic, lexane, PVC, CPVC, and PVDF.

The motivation to utilize the apparatus of Schwartz and Uzoh'030 in the multichamber stations of Cheung is to provide faster throughput and provide a means of processing many substrates at once.

Regarding claim 16: Schwartz and Uzoh '030 fail to teach an inlet above the permeable disc to deliver a fluid onto the permeable disc.

Regarding claim 17: Schwartz and Uzoh '030 fail to teach that the first inlet is disposed in a portion of the shaft.

Regarding claim 22: Schwartz teaches that the permeable disc comprises a plurality of apertures 56 (pores).

Regarding claim 23: Schwartz and Uzoh '030 fail to teach a permeable disk comprises grooves.

Regarding claim 26: Schwartz teaches the planarizer 50, which is coupled to actuator 60 (motor) causes circular rotation between the substrate and the permeable disk.

Regarding claims 28 and 29: The processing stations of Cheung are all capable of polishing conductive or dielectric materials. One of ordinary skill in the design of multistation process apparatus would provide the necessary processing parameters in order to planarize the desired material from a substrate.

Regarding claim 94, Both Schwartz and Uzoh fail to teach a substrate movable between processing positions.

Cheung teaches a substrate carrier (robot, not shown) transferring the substrate to various processing cells thus between a plurality of processing positions.

The motivation to provide the substrate carrier to a multichamber system is to provide for transport of the substrate with decreased contamination from the atmosphere.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide the apparatus of Schwart modified by Utoh in the multichamber system of Cheung with a substrate carrier.

Regarding claim 101 and 115-119: Schwartz teaches a system 10, which includes cell (partial enclosure) 12 defining a processing region and having a first inlet 18, a second inlet 20, and fluid outlet 16. The first and second inlets 18 and 20 are coupled to a supply conduit 21, which carries pressurized electrolyte 22 from a sump assembly. A shaft (conduit 58) is connected to the partial enclosure 12 on one end and to an actuator (motor 60) on an opposing end and adapted to rotate the partial enclosure 12. A permeable disc (rotatable plate 52) is disposed in the partial enclosure.

Schwartz fails to teach vertical and lateral movement.

Uzoh '030 teaches a polishing head 1 that is rotated, vertically moved, and laterally moved.

The motivation to move the polishing head in this fashion is to increase polishing pressure on the workpiece as stated in col.3 lines 14-18.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to modify the apparatus of Schwartz to provide vertical and lateral movement of the substrate carrier as taught by Uzoh'030.

Regarding claim 102: Schwartz and Uzoh'030 fail to teach multiple processing stations, a loading station, and a substrate transfer device.

Cheung illustrates in Fig. 3 an electroplating system platform 200 comprises a loading station 210, a plurality of processing stations 218. Each processing station 218 includes one or more processing cells 240. Substrate orientor 230 acts as a substrate transfer device. Figure 6 illustrates an electroplating process cell 400, the substrate holder assembly 450 is positioned above the process kit 420. The process kit 420 generally comprises a bowl 430, a container body

472, an anode assembly 474 and a filter 476. The container body 472 is preferably comprised of an electrically insulative material, such as ceramics, plastics, acrylic, lexane, PVC, CPVC, and PVDF.

The motivation to utilize the apparatus of Schwartz and Uzoh'030 in the multichamber stations of Cheung is to provide faster throughput and provide a means of processing many substrates at once.

Regarding claim 103: Recall Schwartz teaches a planarizer 50 which is coupled to actuator 60 (motor) and causes circular rotation between the substrate and the permeable disk.

Regarding claim 104: Schwartz and Uzoh fail to teach a polishing station.

Cheung cites that the system comprises processing stations 218 which are capable of comprising a polishing apparatus and thus, polishing materials from the substrate surface. The prior art by Cheung introduces a multichamber system wherein a polishing apparatus is an art recognized processing means in the design of multichamber systems.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide a processing station capable of polishing a substrate surface.

Regarding claim 105: Schwartz and Uzoh fail to teach a substrate held by a substrate carrier between a first and second processing position.

Cheung teaches a substrate carrier (robot, not shown) transferring the substrate to various processing cells thus between a plurality of processing positions.

The motivation to provide the substrate carrier to a multichamber system is to provide for transport of the substrate with decreased contamination from the atmosphere.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide the apparatus of Schwartz modified by Utoh in the multichamber system of Cheung with a substrate carrier.

Regarding claim 106: Cheung teaches that the substrate is treated by a plurality of processing stations, thus providing for a plurality of processing apparatuses.

The motivation to provide the apparatus of Schwartz modified by Utoh in the multichamber system of Cheung with a plurality of processing apparatuses is to

Regarding claim 107: Cheung teaches a plurality of processing stations. Those processing stations are capable of performing deposition and planarizing. The prior art by Cheung introduces a multichamber system wherein a deposition and planarizing apparatuses are art recognized processing means in the design of multichamber systems.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide a processing station capable of deposition of a film and planarizing a substrate.

Regarding claim 108 and 109: Neither Schwartz, Uzoh, or Cheung discuss the proximity of the substrate to the permeable disc. Nevertheless the distance between the substrate and the treating means is an optimizable process parameter well recognized by those of ordinary skill in the art to effect the uniformity of the process result.

Thus, it would have been obvious for one of ordinary skill in the art to ensure that the substrate is an ample distance from or to the treating means to ensure the desired process result.

Regarding claim 110: Schwartz teaches a diffuser plate 30 disposed in the partial enclosure is below the permeable disc 52.

Regarding claim 112: Schwartz teaches a diffuser plate 30 disposed in the partial enclosure is below the permeable disc 52.

Regarding claim 114: Schwartz teaches the planarizer 50, which is coupled to actuator 60 (motor) causes circular rotation between the substrate and the permeable disk.

6. Claims 6, 11, 20, 24, 91, 95 and 97 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schwartz in view Uzoh'030 as applied to claims 1-3, 9, 14, 89, 90, 93, 95, 96, 98, and 100 above in further view of Talieh (USP 6,176,992).

The teachings of Schwartz and Uzoh'030 were discussed above.

Both fail to disclose the material of construction of the permeable disk or anode.

Talieh teaches a mechanical pad assembly 12 disposed in a container (partial enclosure) 20. The mechanical pad 12 includes an anode plate 30 that is made of a porous or solid conductive material (consumable). A mechanical pad 32 (permeable disk) is mounted (is in contact with) onto the face of anode plate 30. Pad 32 is made of a nonconductive porous material such as polyurethane.

The motivation to construct the components of the systems of Schwartz in view Uzoh'030 with materials taught by Talieh is that these would not interfere with the desired physical/chemical properties of the process result. Similarly the anode contacting the permeable disk ensures that the disk is electrically grounded.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to combine the teachings of Schwartz in view Uzoh'030 of Pearson in view Uzoh'030 with those of Talieh.

7. Claims 18, 21, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schwartz and Uzoh'030, in further view of Cheung.

The teachings of Schwartz, Pearson, and Uzoh'030 were discussed above.

All fail to teach to teach multiple processing stations.

Cheung illustrates in Fig. 3 an electroplating system platform 200 comprises a loading station 210, a plurality of processing stations 218. Each processing station 218 includes one or more processing cells 240. Substrate orientor 230 acts as a substrate transfer device. Figure 6 illustrates an electroplating process cell 400, the substrate holder assembly 450 is positioned above the process kit 420. The process kit 420 generally comprises a bowl 430, a container body 472, an anode assembly 474 and a filter 476. The container body 472 is preferably comprised of an electrically insulative material, such as ceramics, plastics, acrylic, lexane, PVC, CPVC, and PVDF.

The motivation to utilize the apparatus of constructed from the combined teachings of Schwartz or Pearson, and Uzoh'030 in the multichamber stations of Cheung is to provide faster throughput and provide a means of processing many substrates at once.

8. Claim 111 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schwartz and Uzoh in view of Cheung as applied to claims15-17, 22, 26, 28, 29, and 101-110, 112, and 114-119 above in further view of Talieh (USP 6,176,992).

The teachings of Schwartz ,Uzoh'030, and Cheung were discussed above.

All fail to disclose the material of construction of the permeable disk or anode.

Talieh teaches a mechanical pad 32 (permeable disk) is mounted (is in contact with) onto the face of anode plate 30. Pad 32 is made of a nonconductive porous material such as polyurethane.

The motivation to construct the components of the systems of Schwartz in view Uzoh'030 with materials taught by Talieh is polyurethane is inert and will not interfere with the desired physical/chemical properties of the process result.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to combine the teachings of Schwartz in view Uzoh'030 with those of Talieh.

9. Claim 113 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schwartz and Uzoh in view of Cheung as applied to claims15-17, 22, 26, 28, 29, and 101-110, 112, and 114-119 above in further view of Pearson.

The teachings of Schwartz, Uzoh, and Cheung were discussed above.

All fail to teach a membrane disposed between the anode (electrode) and the permeable disk.

Pearson teaches a membrane 24 between anode 32, 33 and disk (plate 25).

The motivation to provide a membrane between the anode and disk is to provide additional fluid flow control providing a uniform amount of electrolyte per unit area across the substrate.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to modify the apparatus of Schwartz ,Uzoh, and Cheung to provide a membrane between the anode and disk as Pearson teaches.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sylvia R MacArthur whose telephone number is 703-306-5690. The examiner can normally be reached on M-F during the core hours of 8 a.m. and 2 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory L. Mills can be reached on 703-308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9630 for regular communications and 703-872-9630 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Sylvia R. MacArthur
June 12, 2003
AU 1763